

MORSE CODE, BREAKING THE BARRIER

with flashcards



by Phil Anderson, WØXI

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**AMS Press
Lawrence, Kansas 66044 USA**

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Lawrence, Kansas 66044

FIRST EDITION

FIRST PRINTING - 1982

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Library of Congress Catalog Card Number:

Printed in the United States of America.

Preface

The key to obtaining your Novice Class license or upgrading is to be able to receive International Morse Code well.

Novice and Technician applicants must be able to copy the code at a rate of five words-per-minute. General and Advanced aspirants must copy messages at 13 wpm, and Extra Class applicants must receive messages at 20 wpm.

The purpose of this text is to present to you a method for learning the code that will work for Novice through Extra. Most prospective radio amateurs learn the code initially at five wpm; however, this usually results in forming a stumbling block for relearning the code at the required higher rates later. This text presents the fast character method, also called the enhanced code method, from the start.

Good luck!

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Chapter 1

The Structure of Morse Code

Code is made up of short and long tones, called elements, properly spaced in time. Short tones are called *dits* and long tones are called *dahs*. Messages are coded by the following rules:

1. *Dits* are one unit of time.
2. *Dahs* are three units of time.
3. *Dits* and *Dahs* are separated by one unit of time when coding letters.
4. Coded letters are separated by three units of time when coding a word.
5. Seven units of time are used to space between coded words.

The following examples show how the rules apply.

Example 1. Code for the letter A is *dit dah*. Fig. 1-1 shows this code diagrammed in time. *Dits* are pronounced like combining D and it—Dit. Sometimes when dits are combined with dahs a short form is used called a Di. Simply leave off the t. So the code for the letter A is pronounced *dit dah* or *di dah*. The di should sound short and the dah should sound long. Do not leave any space between the dit and dah but just say di-dah as one word.

Example 2. Code for the letter R is *dit dah dit* or in short form *di dah dit*. To get the rhythm of it, hold the dah out a bit—say *di-daaaaah-dit*. The code is diagrammed in time in Fig. 1-1.

Example 3. Code for the letter T is just *dah*.

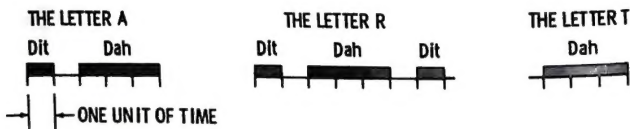


Figure 1-1 Dits and dahs make letter codes

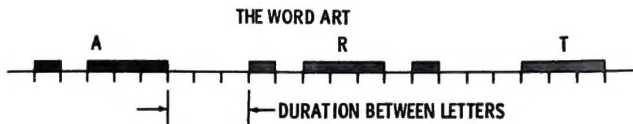


Figure 1-2 Word codes from letter codes

Example 4. Using the above rules, the time duration between two characters of a single word is the duration of a dah. For example, the word ART, shown diagrammed in time in Fig. 1-2, is coded *dit dah-dit dah dit-dah*. Just to make sure we are together, let's send the word ART in code by saying it aloud. *Di-dah—pause—di-dah-dit—pause—dah*. Now try the word RAT. It's coded *di dah dit-di dah-dah* or *R—pause—A—pause—T*.

In summary, letters, numbers, and punctuation can be coded by using combinations of dits and dahs. These dits and dahs are tones which each have a defined duration of time. In addition, these coded letters can be combined with proper spacing to make words and sentences.

Chapter 2

Definition of Code Speed — Words-per-Minute

FCC rules say that you must pass a code receiving test at a *code speed* or rate of five words per minute. So what do they mean by five words per minute?

Code speed is rated at so many words sent or received per minute where a word is considered to be five characters in length. So, if twenty-five characters are sent in one minute, the rate is twenty-five characters per minute or $25/5$ words per minute. In general, code speed is the number of characters received divided by five and then divided by the time in minutes to receive it. For example, if the following sentence were sent in two and one-half minutes—

**WE SUGGEST YOU LEARN EACH CODE GROUP LISTED
BEFORE PROCEEDING ON TO THE NEXT GROUP.**

—the code speed would be in WPM (words per minute) = 82 characters divided by 5 and then divided by 2.5, or

$$\text{WPM} = \frac{82 \div 5}{2.5} = 6.5$$

Incidentally, the rules count spaces between words as one character too.

Now, let's see how you might learn to receive the code so that your receiving speed increases easily.

Chapter 3

Learning to Receive Code

You can learn to receive Morse Code at five words-per-minute, wpm, in a matter of a few study sessions. This can be done by memorizing the construction of the codes for each of the letters, and practicing receiving them. This is a great temptation.

However, you might as well face the music now; code at 13 to 20 wpm **will not** sound the same as that at 5 wpm. You will have to learn the code all over again for the different sounds at these speeds. The job will be harder too!

Fortunately, if you approach the task of learning to receive Morse as we suggest, the two-step task from 5 to 13 wpm should be unnecessary. The essence of the method is to start by listening to individual character codes at 13 wpm right away. You will not, of course, listen to words or sentences at that speed. You'll learn the sound of each of the code characters at that rate.

Here are the rules to follow:

1. Listen to the sound rather than the construction of code characters.
2. Start with codes for the letters X and C, or other long codes, rather than with codes for E, I, S.
3. Start with individual letter codes sent at high speed but with the codes spread out.
4. Start by just listening; do not try to write down what you have heard.

5. Practice often but not for long periods.
6. Don't bother with a code oscillator and sending at first; this will come later.

Now, let us take a closer look at these rules.

Rule 1: Listen to the sound rather than the construction of code characters.

That is, don't pick out the dits and dahs (dots and dashes) of the code as you hear them and then convert that to a letter, just hear the dits and dahs as a whole sound and say the letter **they** correspond to. In other words, don't take the code for the letter C, which is dah di dah di and think: let's see, that's a dash and a dot followed by a dash and dot — dash dot dash dot is C — OK. Instead, hear dah di dah di — aha, that's a C. The second way is much faster, the first will limit you to about 7 wpm.

Rule 2: Start with codes for the letters X and C, or other long codes, rather than with codes for E, I and S.

The point here is that we want you to hear the difference between dahs and dits right away. When dahs and dits are sent in a batch it is much easier to distinguish them apart. You'll be able to distinguish between the codes for X and C right away. The short codes for E and I will follow more easily then. A recommended order list for learning the letters is printed on the back cover.

Rule 3: Start with individual letter codes sent at high speed but with the codes spread out.

For example, send the letter X at a rate of 13 to 20 wpm but then wait at a rate of 5 wpm before the next letter is sent, say C. This is called enhanced code. The point is that you learn to hear the codes at a high speed even though you do not receive a large number of codes in say a minute. Then later, when you try to copy code that is sent all at 20 wpm, you'll have already learned to "hear" those characters at that speed. Again, if you start at 5 wpm to learn the codes for the letters, you'll most likely have to learn them over at 20 wpm. So why not start out high?

Rule 4: Start by just listening; do not try to write down what you hear. You'll have a great tendency to want to write down each letter as you hear it but don't do it. Just listen and say each letter or every two letters that come along. It's much faster and lets your mind concentrate on learning to recognize the codes. Trying to write them down takes too much effort and poor results are obtained. Writing down the letters can come later. When you do start writing, use cursive and don't print; cursive is faster, using less motion.

Rule 5: Practice often but not for long periods. Try ten minutes three times a day at first.

As with any exercise, you will get tired. Code can put you to sleep very quickly. Work with three or four letter codes at a time at first, and stop as soon as your mind starts to wander or you miss badly. Come back to it later.

Rule 6: Don't bother with a code oscillator and sending at first; this will come later, almost automatically.

Remember, you'll learn to copy code at medium and high speeds by listening to the sound of the codes. Once you've heard good examples of the rhythm of each of these codes you'll be able to repeat them accurately.

Cassette Tapes

At this point, you may be wondering how you are going to obtain a source for the code in the form we suggest.

You can obtain cassette tapes from one of the many ham radio vendors. Generally, code sent such that characters are sent fast but are spread out in time is called enhanced, super code or just what it is — "fast characters." Or you could have a ham friend make you a tape.

The second best thing is to start at an intermediate speed of at least 10 wpm. Many tapes are available at 10 and 13. Stick with it; it will be a little difficult at first.

If you are starting fresh, use the flashcards enclosed in the next chapter.



Chapter 4

Flashcards for Initial Memorization

Flashcards of the code sounds for A to Z and their corresponding characters are enclosed in the next 13 pages. These are intended for the newcomer, a person trying the code again or for review.

The basic idea behind these cards is that you should learn to copy Morse Code by the **sounds** of each character code. For example, when you hear dah-di-dah-dit, you should recognize that sound as the letter 'C'. But **do not** count the number and order of the dots and dashes. As we said earlier, this will slow your progress!

To support the sound method, the cards have the pronunciation printed on one side and the corresponding letter on the opposite side. Cut the cards out and arrange them with the sound side up; that is, place the 'C' card with dah-di-dah-dit face up. Then to use them, read the sound outloud and then say the corresponding letter. By practicing this way, you hear the sound and then identify the letter.

Arrange the card deck in groups as suggested on the back cover. Work with just four or five cards at a time at first and then start combining groups. When you've learned to recognize the entire alphabet, start working with cassette tapes at the 13 wpm rate. Good luck.



Chapter 5

Special Codes / Copying Off the Air

For the uninitiated, copying code off the air can be tough. All sorts of codes are heard that don't seem to be Morse codes! Actually, what you'll hear are procedural codes, special Q codes and abbreviations. These are used to cut down on the number of characters sent in a message; hence, the message can be sent much faster.

The following are simulated examples of on-the-air conversations. Note the abbreviations and Q codes used.

W2FOG de KA4TVU — TNX for the comeback old man — UR
RST is 599 — My QTH is Wellerton, Tenn. — Name here is Stu
— You are my first contact as an amateur — Please QSL and I
will have you down for worked all states — W2FOG de KA4TVU
KN

AAØA de KAØGW — OK on the report — Again, my QTH is
Purdeeville, KS — There is a lot of line noise and QRM on this
end too, but I copy you OK — I just built a homebrew filter and it
helps me read in the QRM — I plan to put up a beam this winter
to help me get out of this valley a little better — So how CPY?
AAØA de KAØGW K

The sounds (codes) for these special characters or words are in the appendix. Familiarize yourself with them before trying to listen to amateur broadcasts.



Appendix

MORSE

didahdidahdidah
dahdahdididahdah
dididahdahdit
dahdidididah
didahdidahdit
didididahdidah
didahdididit
dahdidah
dididididididit
dahdididahdit
didididahdit
dahdidahdidah

.
,
?
—
AR
SK
AS
K
E ... E
/

SPECIAL SYMBOLS

Period
Comma
Question mark
Double dash
End of message
End of work
Wait
Invitation to transmit
Error
Fraction bar
Understood
Attention

MORSE

dit dah
dit dit
dit dit
dit dit
dit dit
dah dit
dah dah
dah dah
dah dah
dah dah

dah dah
dah dah
dit dit
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dah dah

1
2
3
4
5
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7
8
9
0

NUMBERS

Some Code Abbreviations

Meaning	Abbreviation
Antenna	ANT
End of message (code of letters is run together—no space between A and R)	AR
Copy	CPY
Calling all amateurs	CQ
See you	CU
Means from	DE
Fine business or great	FB
Feet	FT
Here	HR
How	HW
Invitation to transmit	<u>KN</u>
Equipment you are operating	RIG
Thanks	TNX
Your	UR
Weather	WX
And	ES

"Q" SIGNALS

QRA	What is the name of your station?
QRK	What is my signal intelligibility? (1-5)
QRL	Are you busy?
QRM	Is my transmission being interfered with?
QRN	Are you troubled by static?
QRO	Shall I increase transmitter power?
QRP	Shall I decrease transmitter power?
QRQ	Shall I send faster?
QRS	Shall I send slower?
QRT	Shall I stop sending?
QRX	When will you call again?
QRZ	Who is calling me?
QSB	Are my signals fading?
QSK	Can your work break in?
QSL	Can you acknowledge receipt?
QSO	Can you communicate with....direct?
QSY	Shall I change frequency?
QSZ	Shall I send each word/group more than once? (Answer, send twice or....)
QTH	What is your location?
QTR	What is your time?

Sound	letter
dah di di dah	X
dah di dah di	C
di dah	A
dah di di	D
di	E
dah	T
di dah di	R
di di di	S
di di dah di	F
di dah di di	L
di di dah	U
dah dah di dah	Q
di dah dah dah	J
di di di di	H
dah dah dah	O
dah di	N
dah di di di	B
di di	I
di dah dah di	P
dah di dah dah	Y
di di di dah	V
dah dah di	G
dah dah	M
dah dah di di	Z
dah di dah	K
di dah dah	W